FIG. 1

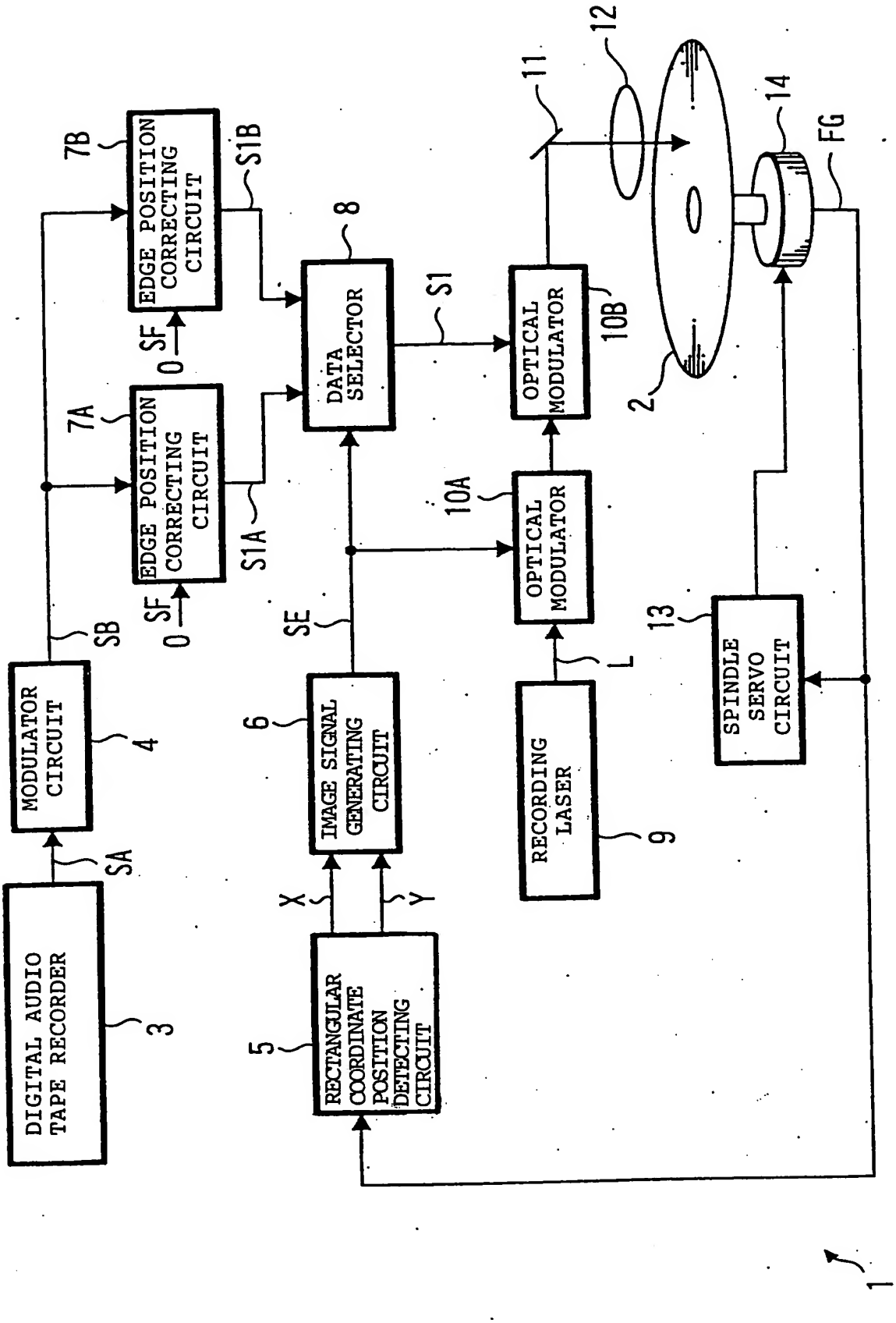

DIGITAL AUDIO TAPE RECORDER
3
SA
MODULATOR CIRCUIT
4
SB
7A
7B
EDGE POSITION CORRECTING CIRCUIT
EDGE POSITION CORRECTING CIRCUIT
SF
SF
S1A
S1B
RECTANGULAR COORDINATE POSITION DETECTING CIRCUIT
5
X
Y
IMAGE SIGNAL GENERATING CIRCUIT
6
SE
8
DATA SELECTOR
S1
10A
OPTICAL MODULATOR
OPTICAL MODULATOR
10B
L
RECORDING LASER
9
11
12
2
14
FG
13
SPINDLE SERVO CIRCUIT
1

FIG. 2

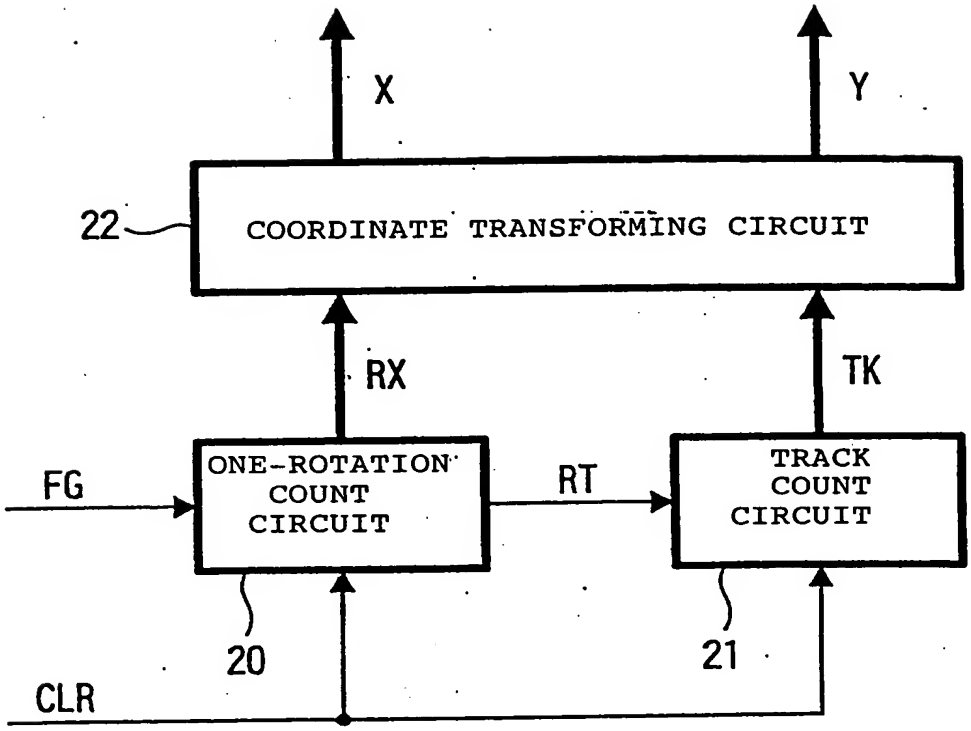

X
Y
22
COORDINATE TRANSFORMING CIRCUIT
RX
TK
FG
ONE-ROTATION COUNT CIRCUIT
RT
TRACK COUNT CIRCUIT
20
21
CLR

FIG. 3

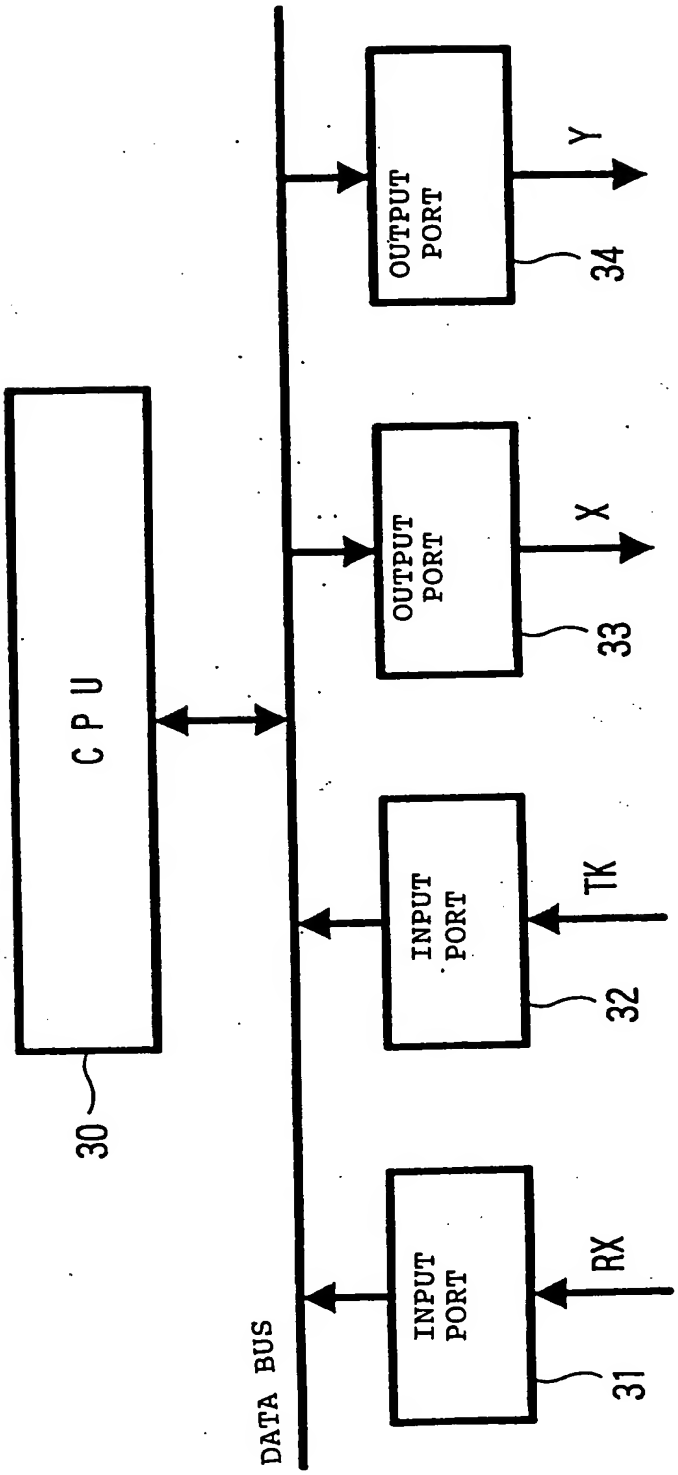
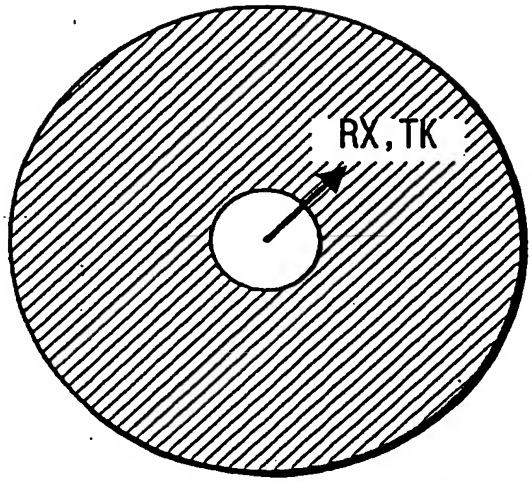
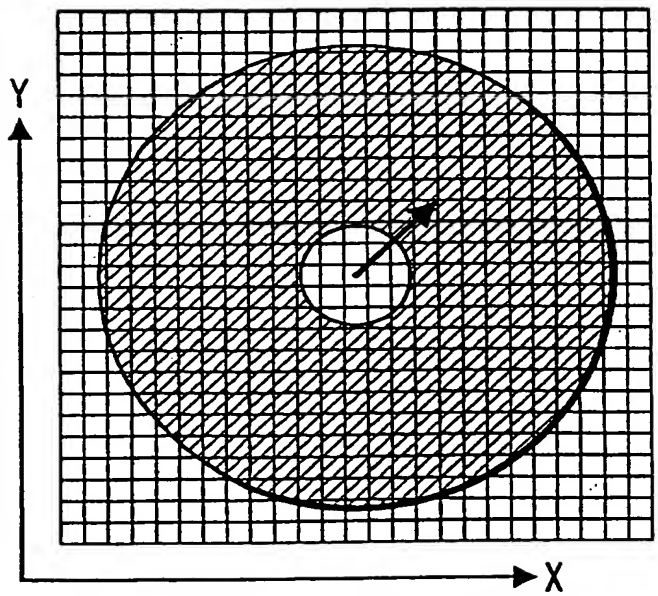

CPU
30
DATA BUS
INPUT PORT
31
RX
INPUT PORT
32
TK
OUTPUT PORT
33
X
OUTPUT PORT
34
Y

FIG. 4A



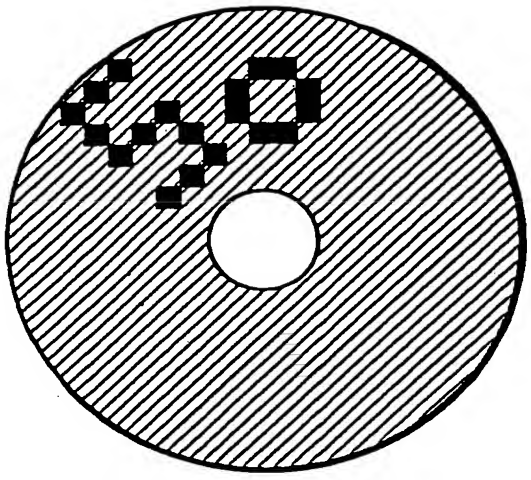
POSITIONAL INFORMATION ON
POLAR COORDIATE SYSTEM

FIG. 4B



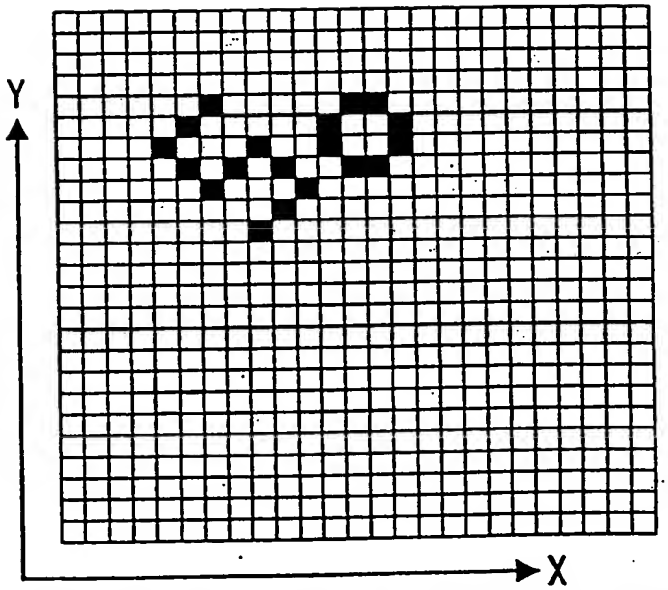
POSITIONAL INFORMATION ON
RECTANGULAR COORDINATE SYSTEM

FIG. 5A



PATTERN TO BE DRAWN ON DISK

FIG. 5B



PATTERN RECORDED IN INTERNAL MEMORY
OF CHARACTER SIGNAL GENERATING CIRCUIT

FIG. 6

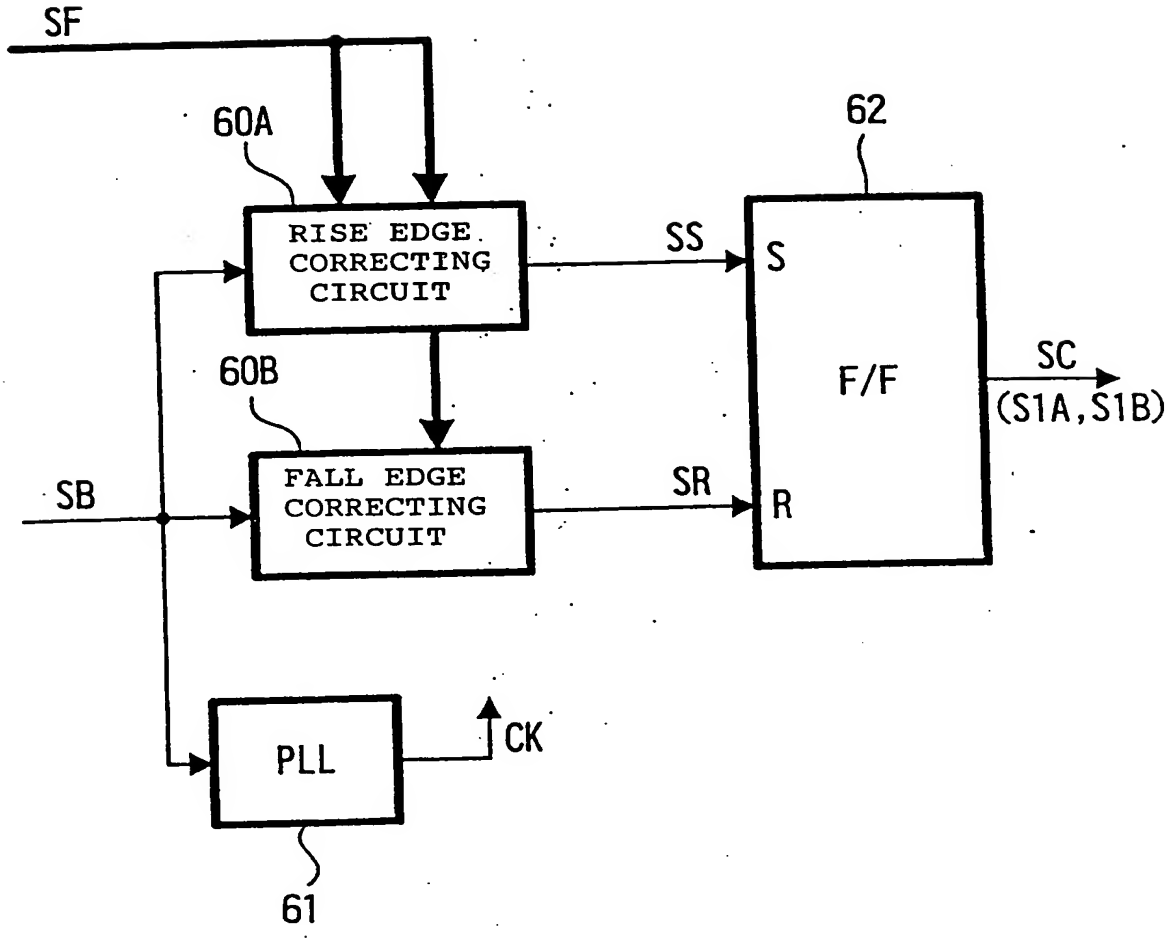

SF
60A
62
RISE EDGE CORRECTING CIRCUIT
SS
S
F/F
SC
(S1A,S1B)
60B
FALL EDGE CORRECTING CIRCUIT
SB
SR
R
PLL
CK
61

FIG. 7

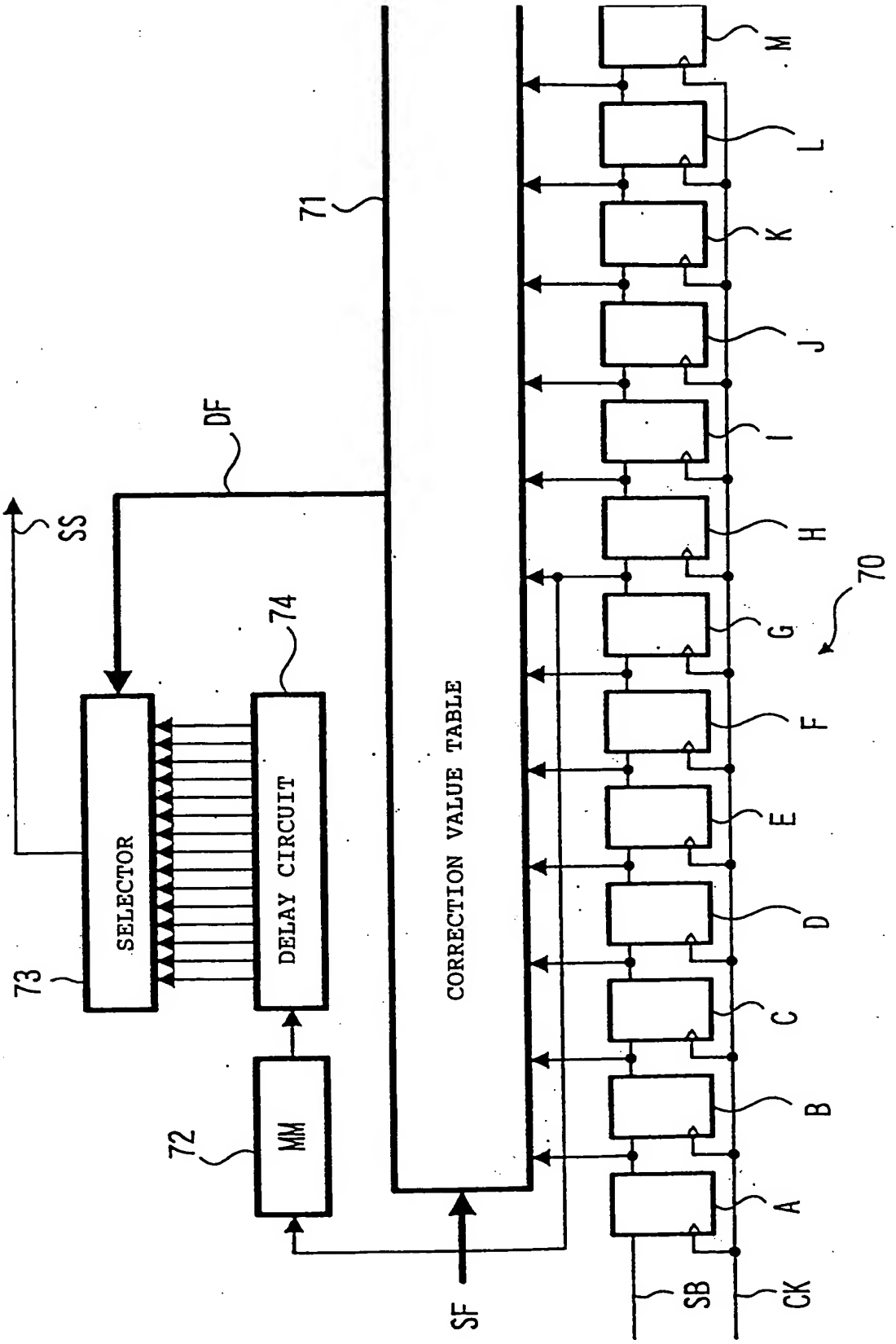

71
DF
SS
74
SELECTOR
DELAY CIRCUIT
73
72
MM
CORRECTION VALUE TABLE
SF
70
M
L
K
J
I
H
G
F
E
D
C
B
A
SB
CK

FIG. 8

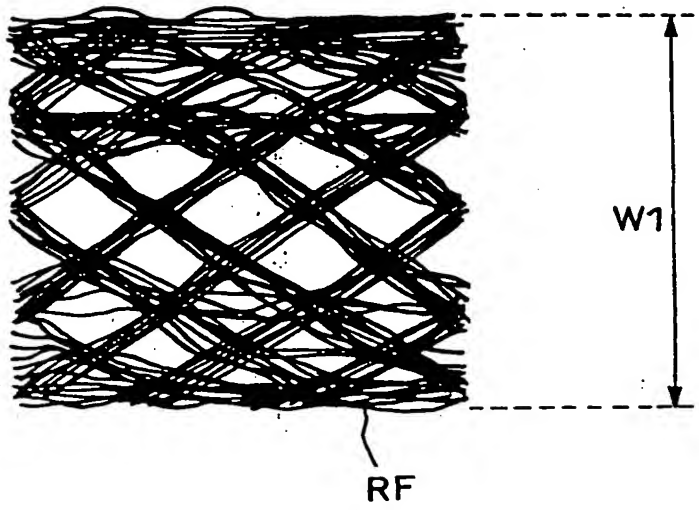


FIG. 9

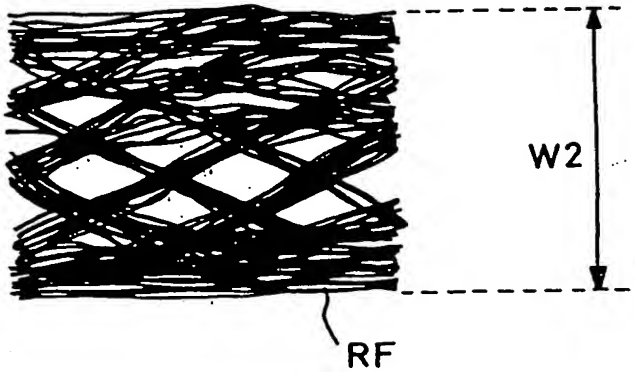


FIG. 10

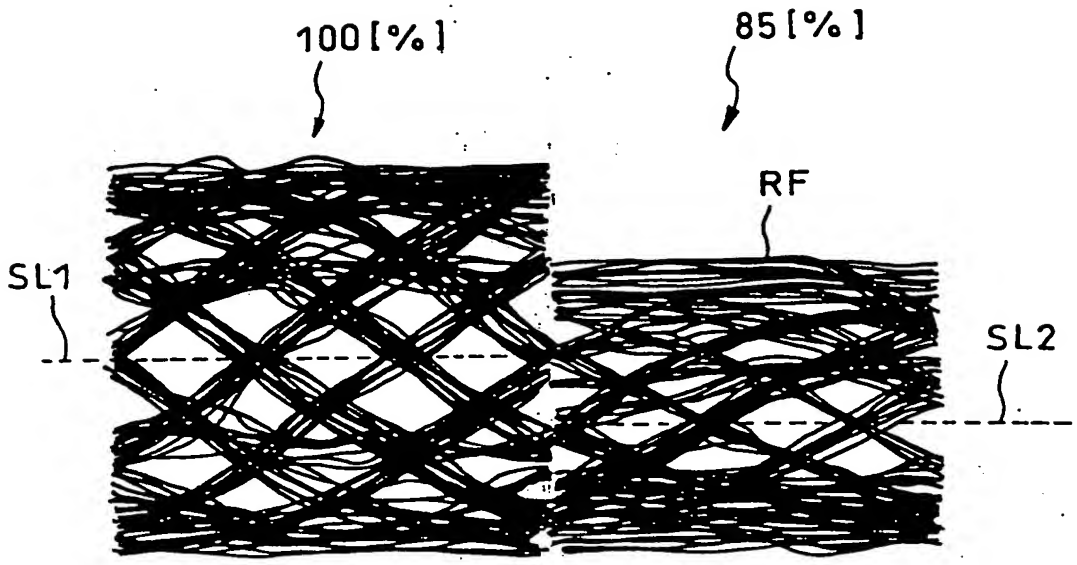
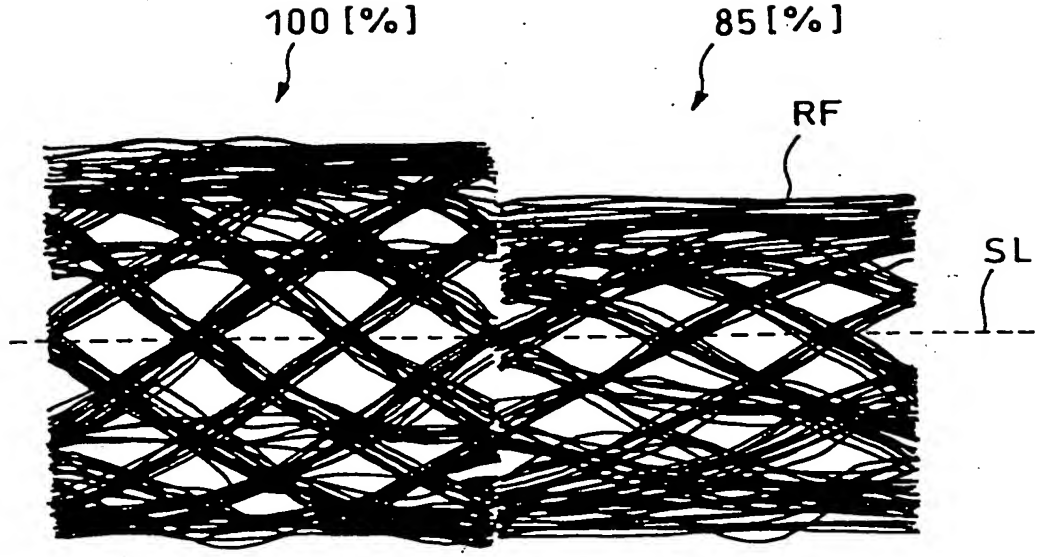


FIG. 11



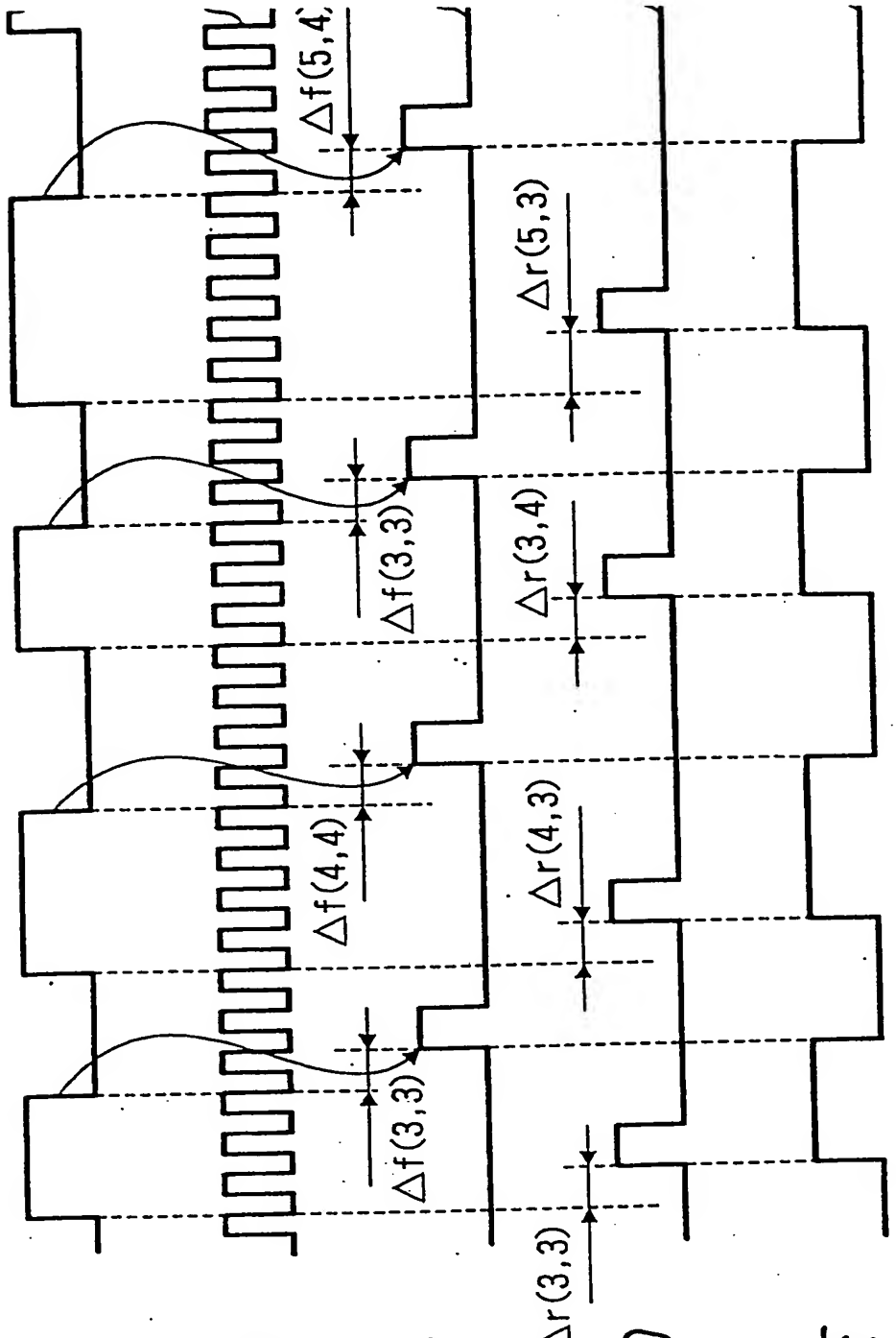


FIG. 12A FIG. 12B FIG. 12C FIG. 12D FIG. 12E

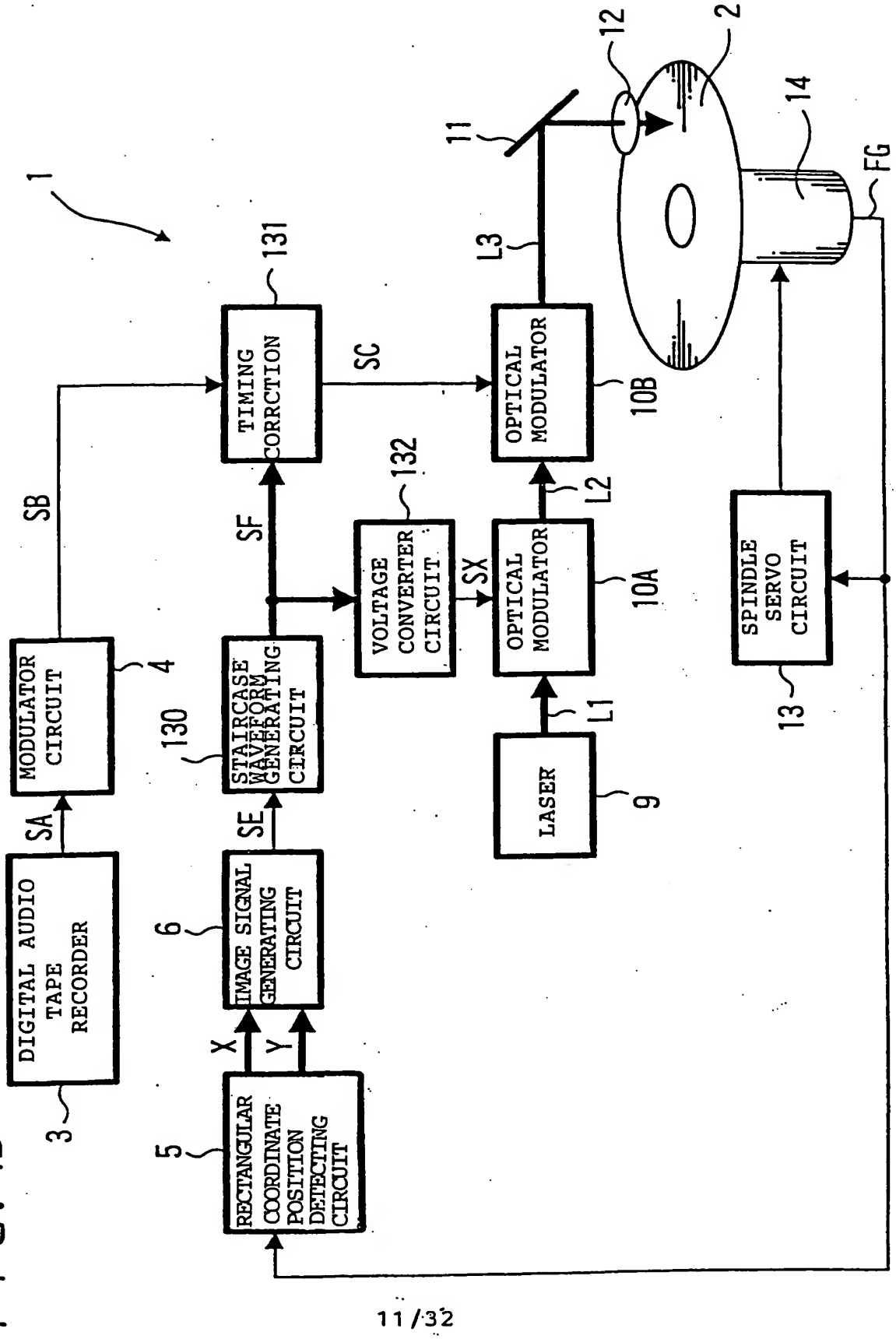
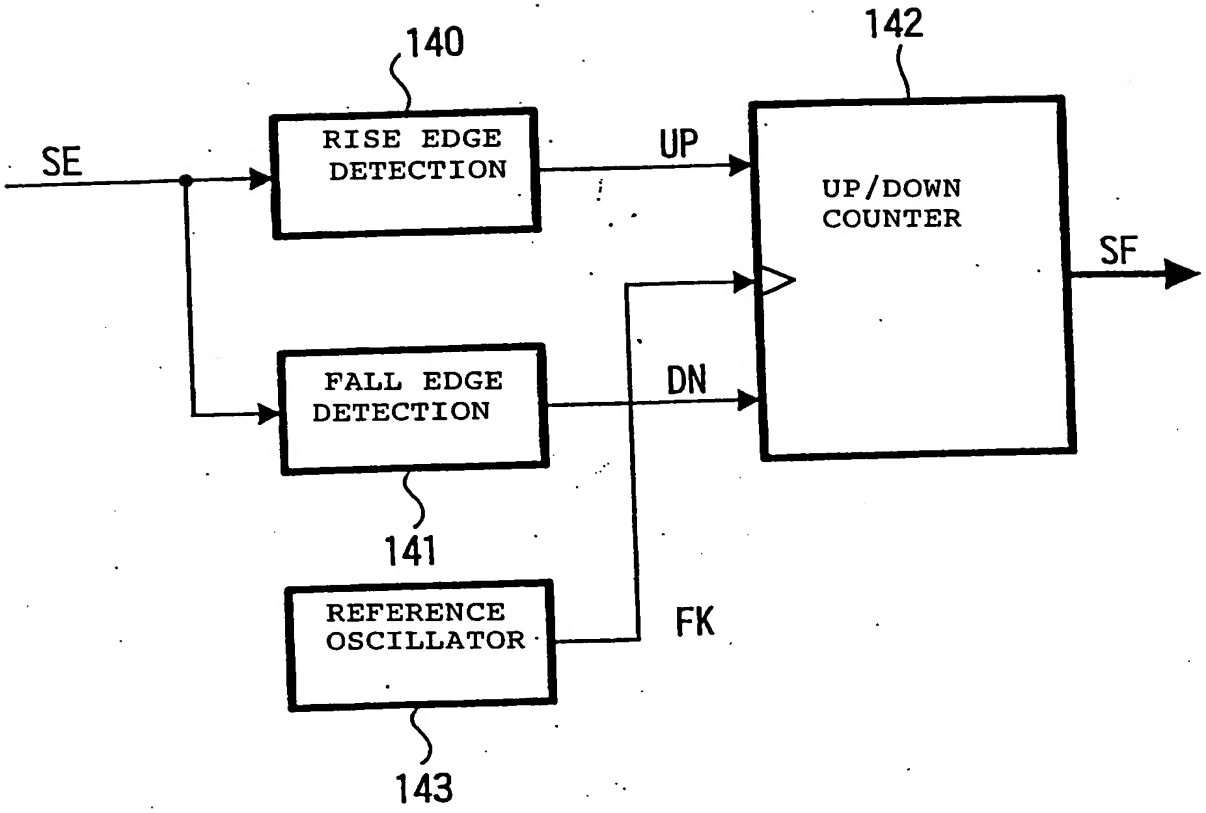

1
DIGITAL AUDIO TAPE RECORDER
3
SA
MODULATOR CIRCUIT
4
SB
RECTANGULAR COORDINATE POSITION DETECTING CIRCUIT
5
X
Y
IMAGE SIGNAL GENERATING CIRCUIT
6
SE
STAIRCASE WAVEFORM GENERATING CIRCUIT
130
SF
TIMING CORRCTION
131
SC
VOLTAGE CONVERTER CIRCUIT
132
SX
LASER
9
L1
OPTICAL MODULATOR
10A
L2
OPTICAL MODULATOR
10B
L3
11
12
2
14
FG
SPINDLE SERVO CIRCUIT
13

FIG. 13

FIG. 14


140
142
SE
RISE EDGE DETECTION
UP
UP/DOWN COUNTER
SF
FALL EDGE DETECTION
DN
141
REFERENCE OSCILLATOR
FK
143

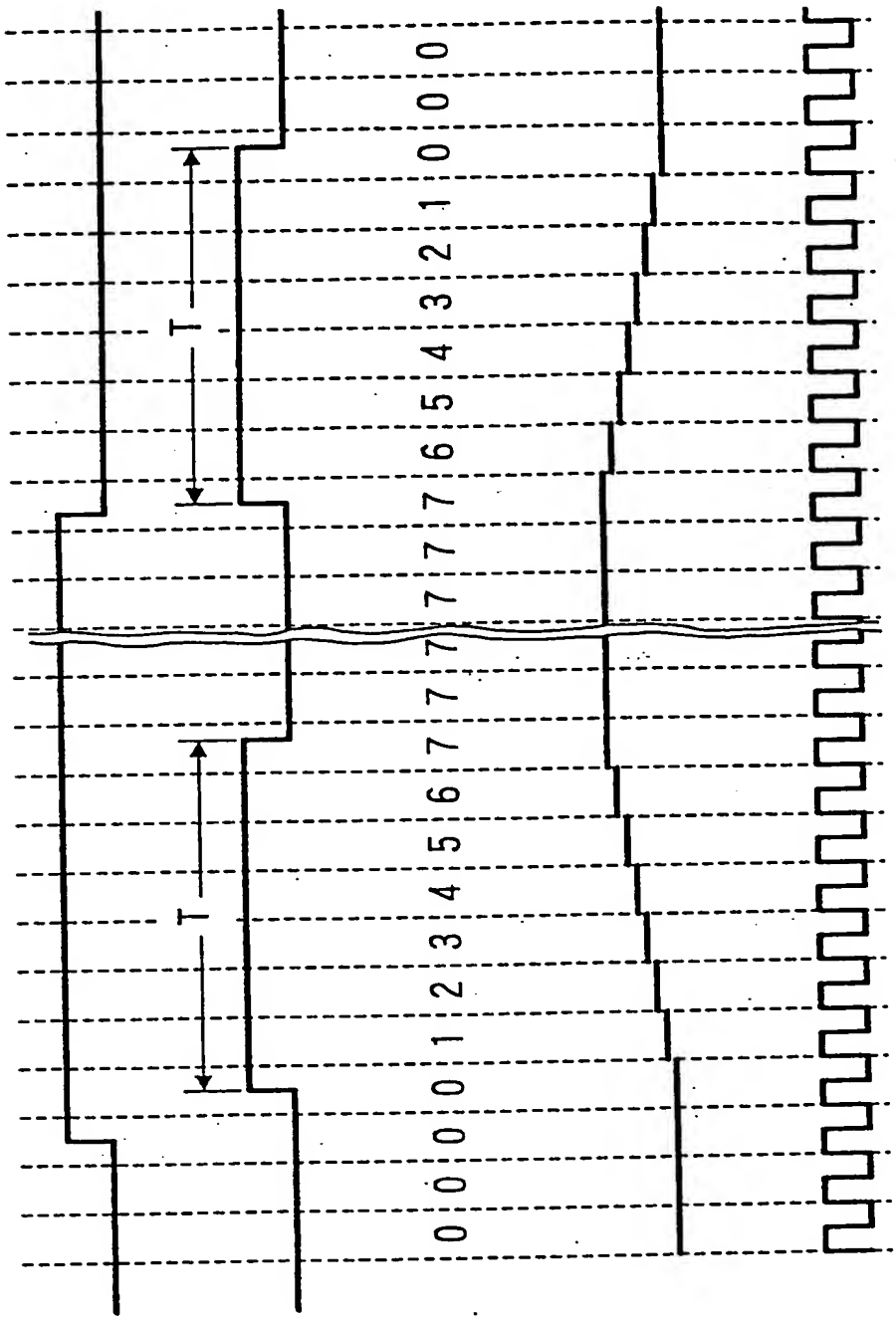


FIG. 15A SE

FIG. 15B UP DN

FIG. 15C SF

FIG. 15D SX

FIG. 15E FK

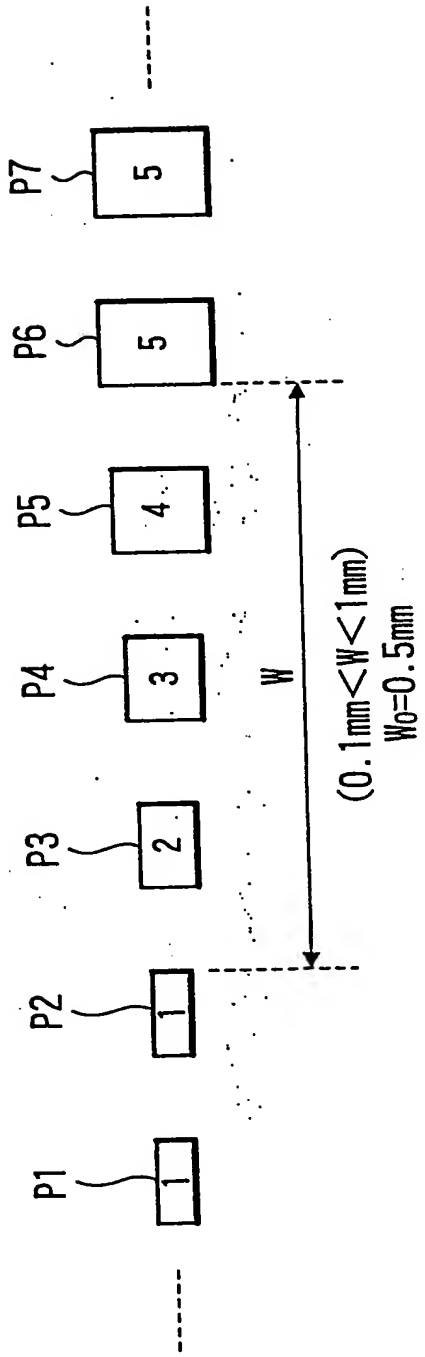
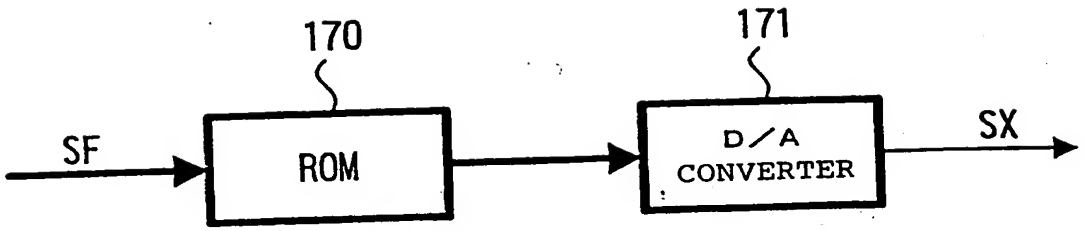


FIG. 16

FIG. 17



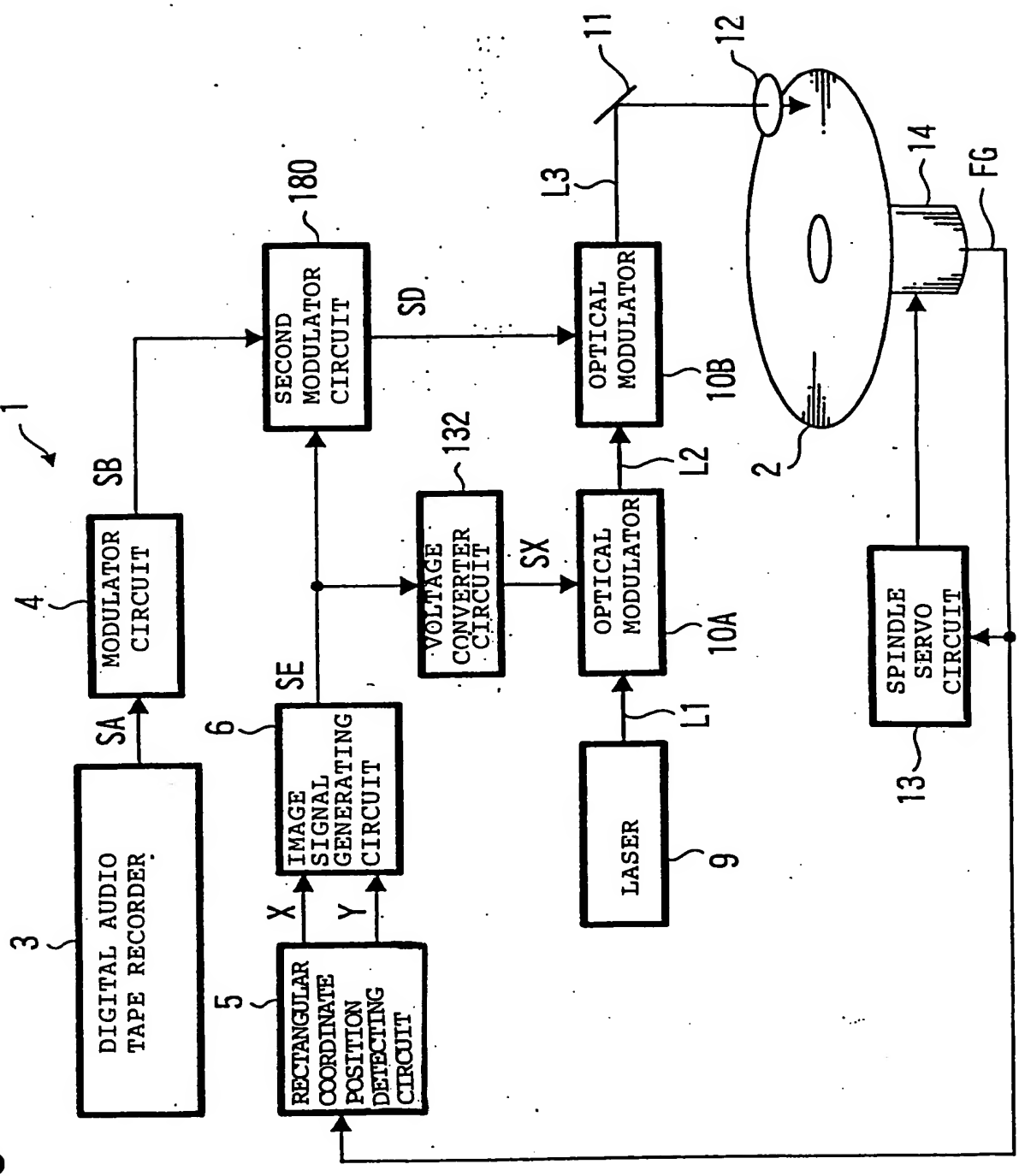

1
DIGITAL AUDIO TAPE RECORDER
3
SA
MODULATOR CIRCUIT
4
SB
SECOND MODULATOR CIRCUIT
180
SD
RECTANGULAR COORDINATE POSITION DETECTING CIRCUIT
5
X
Y
IMAGE SIGNAL GENERATING CIRCUIT
6
SE
VOLTAGE CONVERTER CIRCUIT
132
SX
LASER
9
L1
OPTICAL MODULATOR
10A
L2
OPTICAL MODULATOR
10B
L3
11
12
2
14
FG
SPINDLE SERVO CIRCUIT
13

FIG. 18

FIG. 19

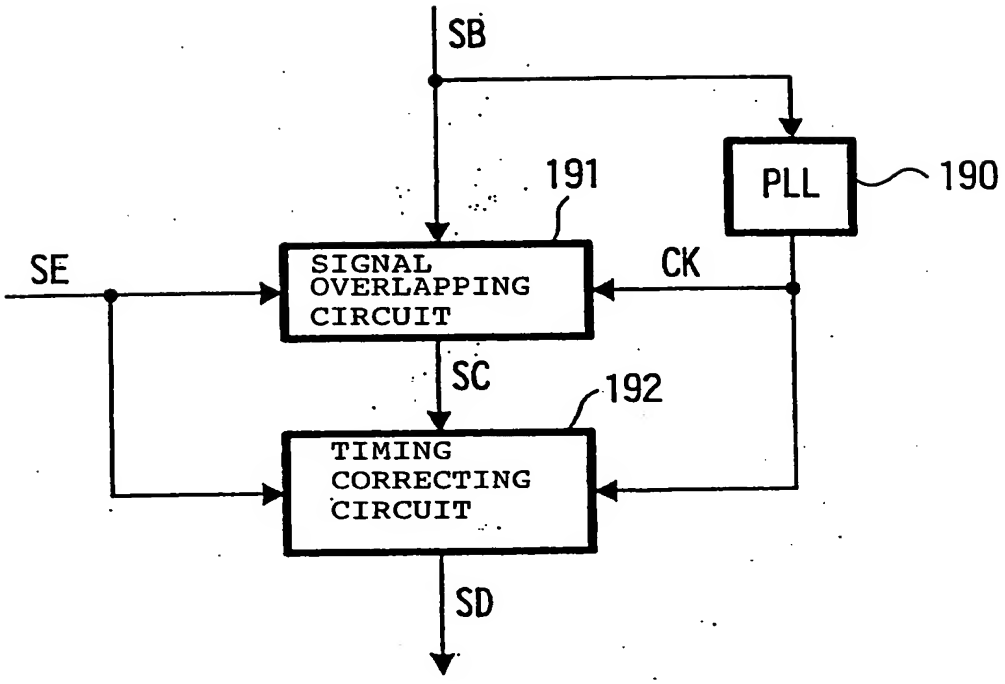
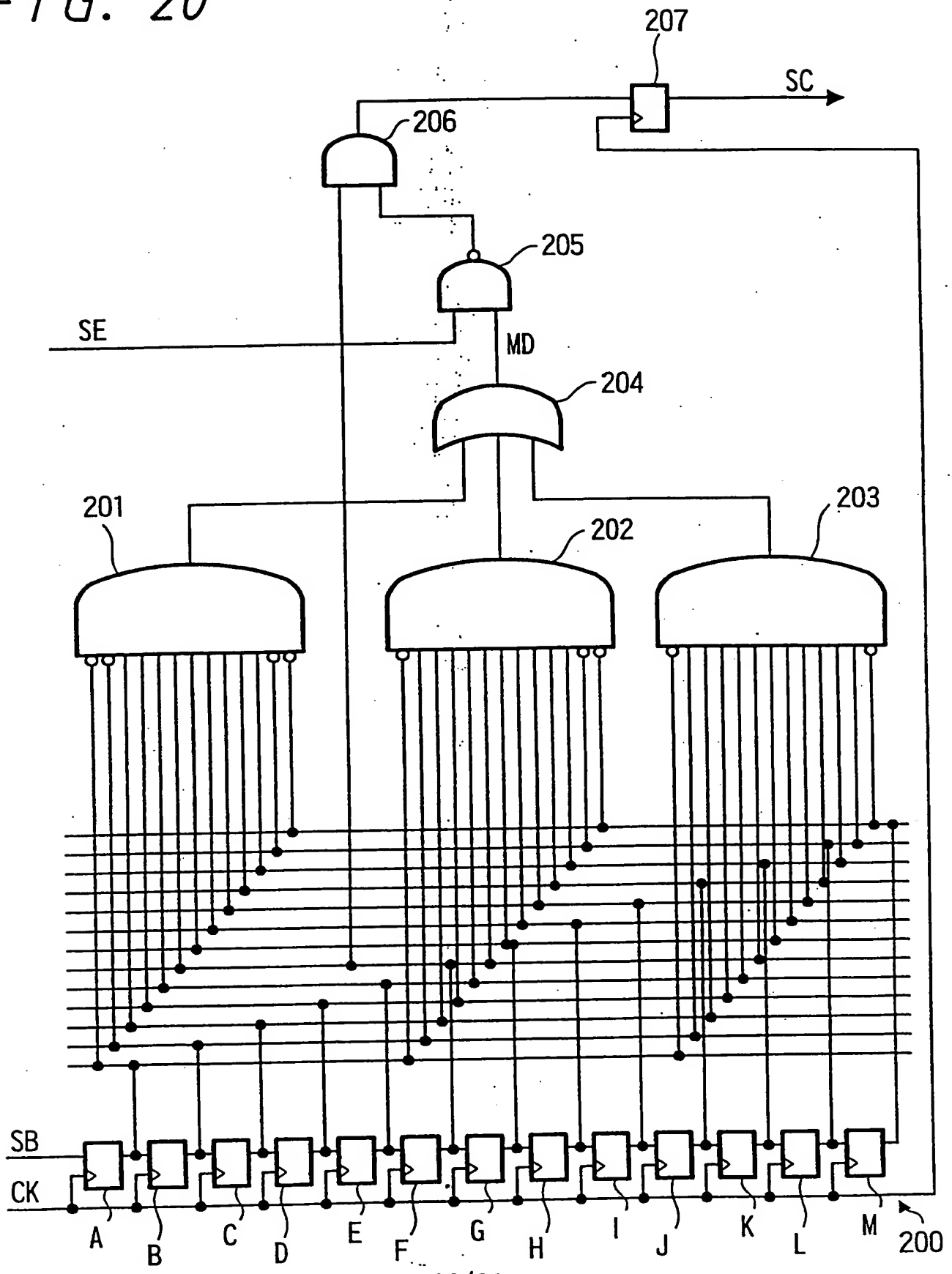

SB
PLL
190
191
SE
SIGNAL OVERLAPPING CIRCUIT
CK
SC
192
TIMING CORRECTING CIRCUIT
SD

FIG. 20



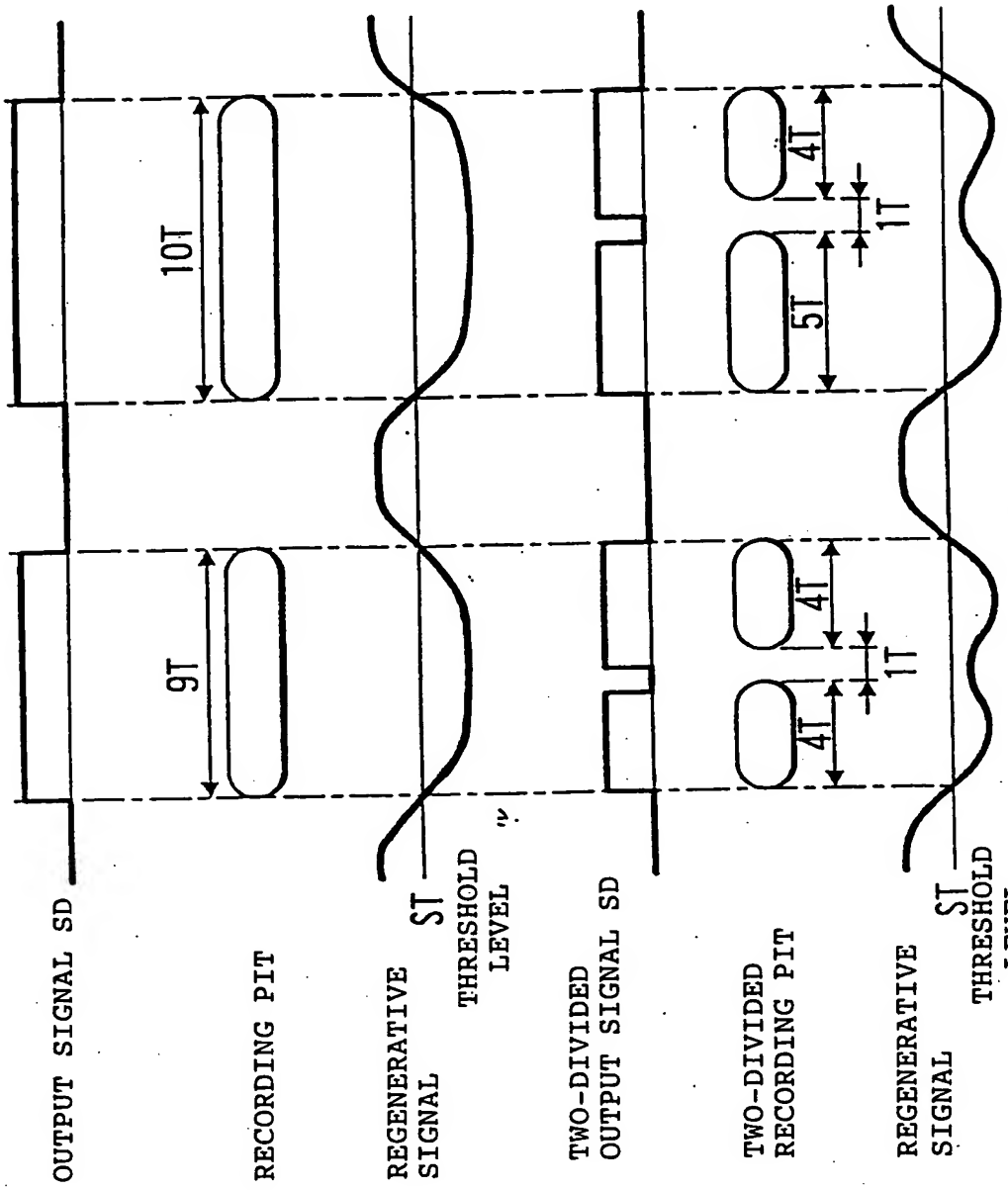


FIG. 21A

FIG. 21B

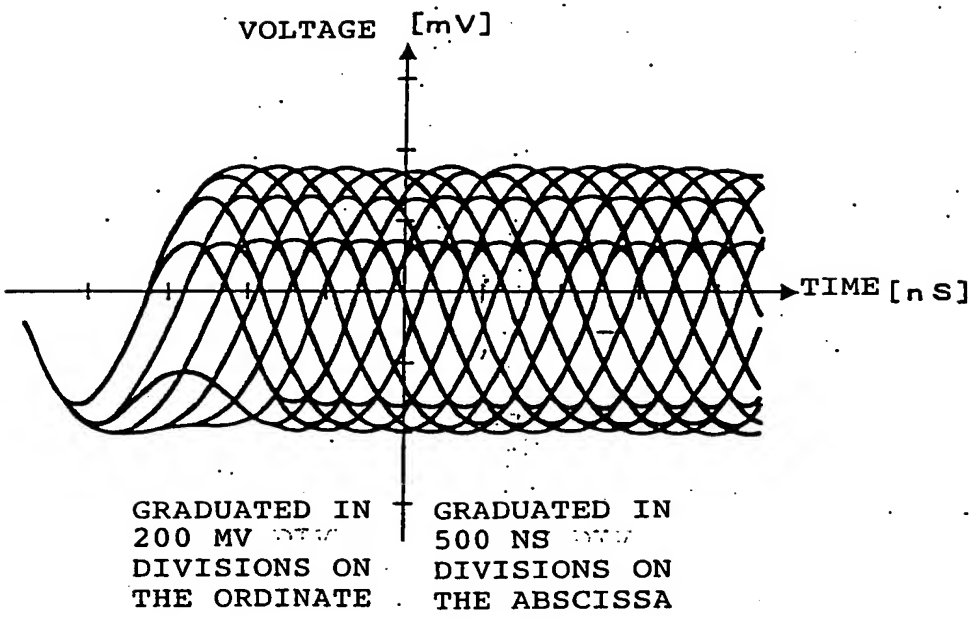
FIG. 21C

FIG. 21D

FIG. 21E

FIG. 21F

FIG. 22


VOLTAGE [mV]
TIME [nS]
GRADUATED IN 200 MV DIVISIONS ON THE ORDINATE
GRADUATED IN 500 NS DIVISIONS ON THE ABSCISSA

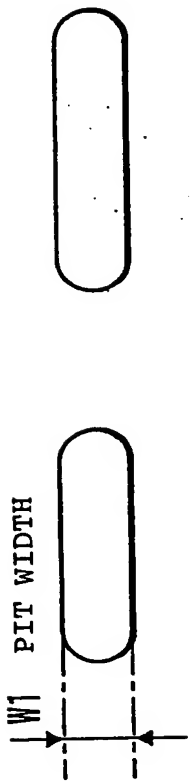


FIG. 23A USUAL RECORDING PIT

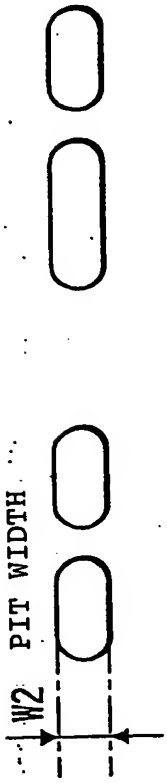


FIG. 23B TWO-DIVIDED RECORDING PIT

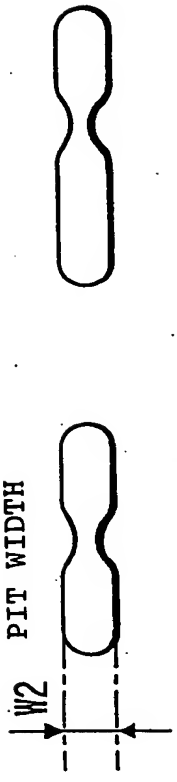


FIG. 23C REPRESSED RECORDING PIT

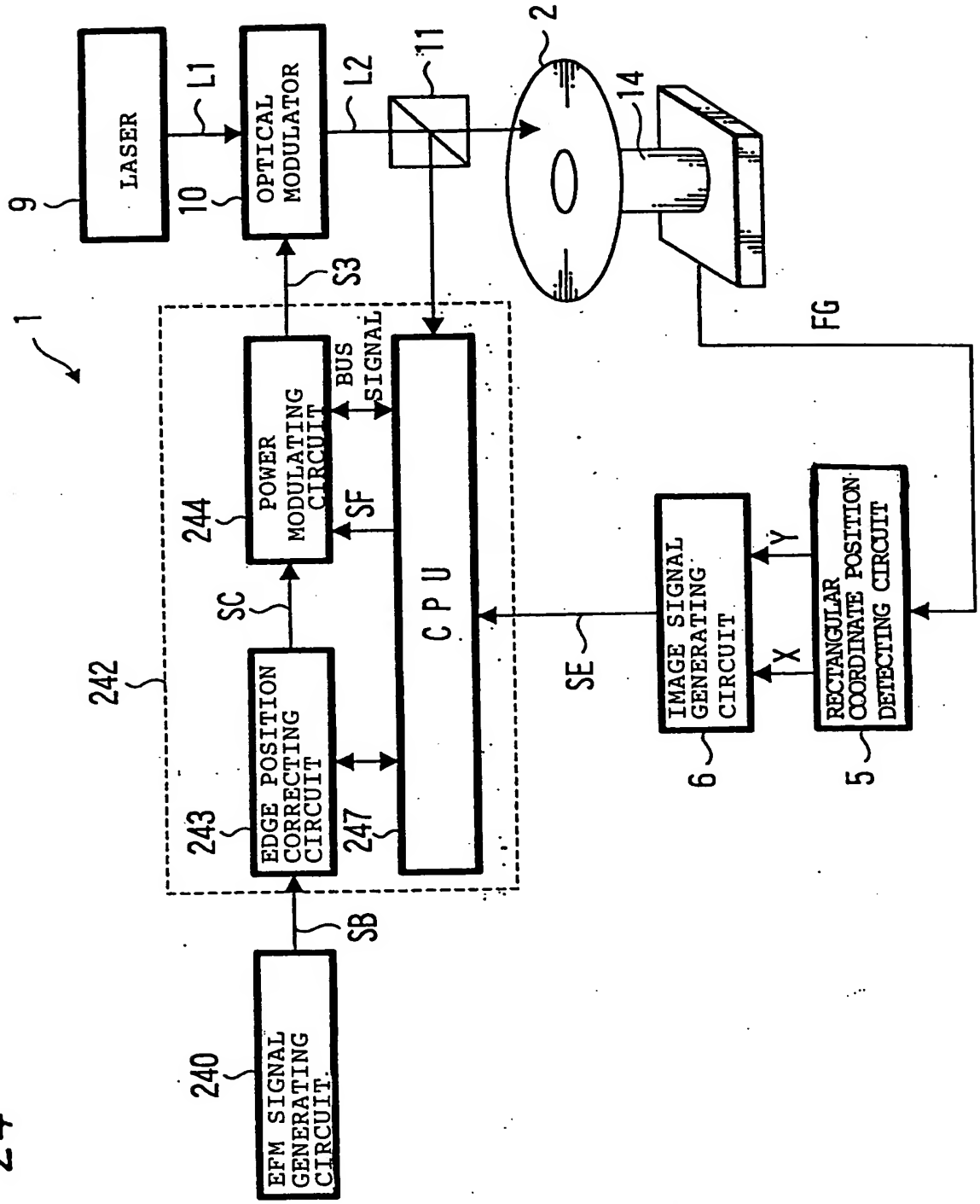
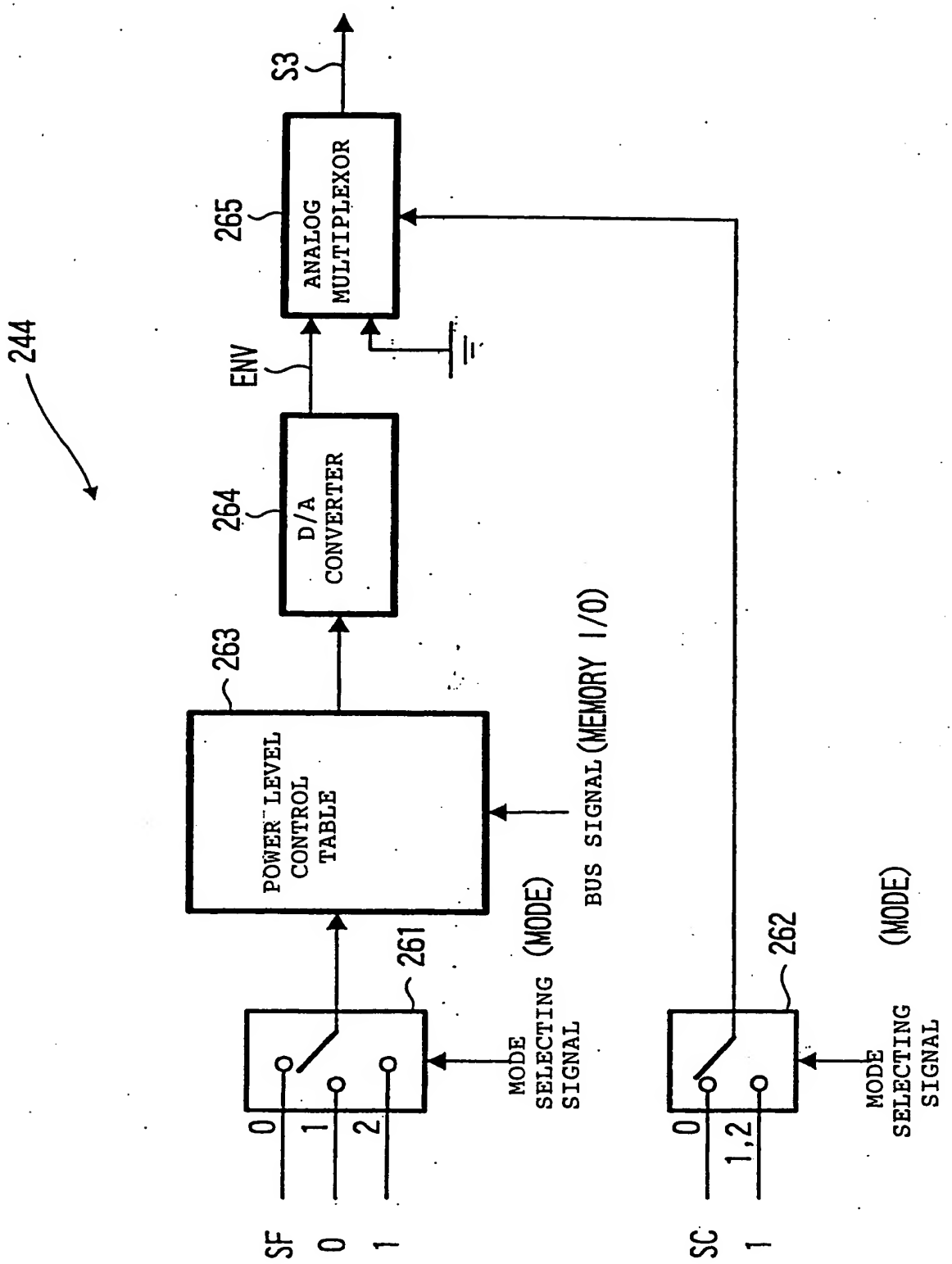

LASER
OPTICAL MODULATOR
L1
L2
9
10
11
2
14
1
S3
FG
BUS
SIGNAL
POWER MODULATING CIRCUIT
244
SF
SC
242
CPU
EDGE POSITION CORRECTING CIRCUIT
243
247
SB
SE
IMAGE SIGNAL GENERATING CIRCUIT
6
RECTANGULAR COORDINATE POSITION DETECTING CIRCUIT
5
Y
X
EFM SIGNAL GENERATING CIRCUIT
240

FIG. 24

FIG. 25


244
S3
265
ANALOG MULTIPLEXOR
ENV
264
D/A CONVERTER
263
POWER LEVEL CONTROL TABLE
BUS SIGNAL (MEMORY I/O)
261
MODE SELECTING SIGNAL (MODE)
0
1
2
SF
0
1
262
MODE SELECTING SIGNAL (MODE)
0
1,2
SC
1

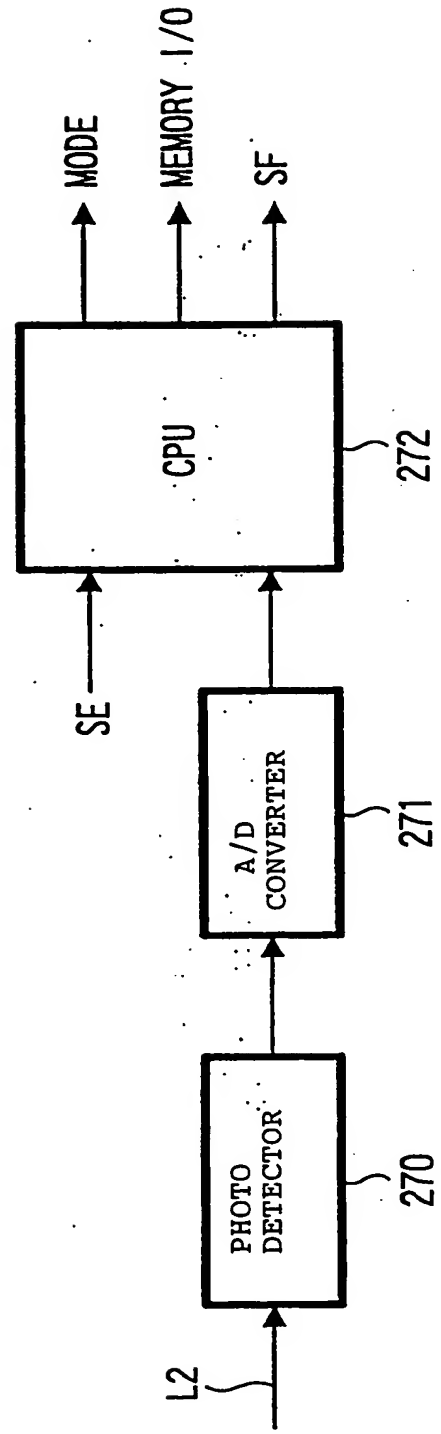

MODE
MEMORY I/O
SF
CPU
272
SE
A/D CONVERTER
271
PHOTO DETECTOR
270
L2

FIG. 26

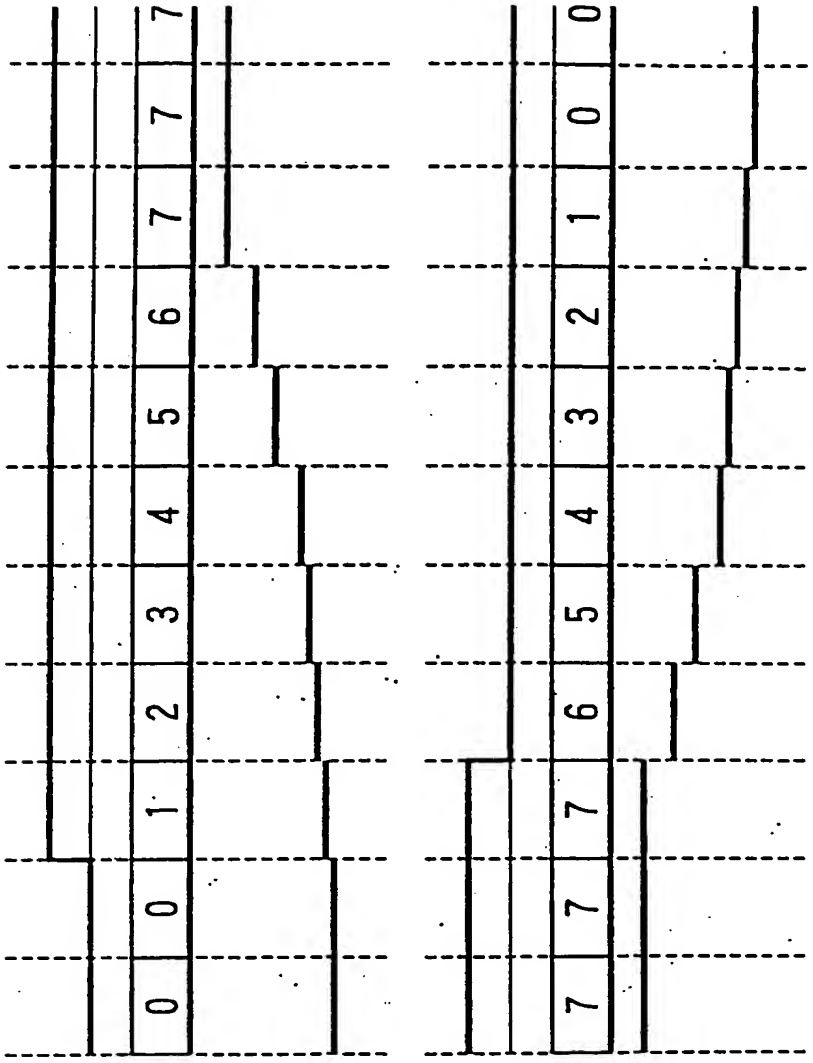


FIG. 27A

FIG. 27B

FIG. 28

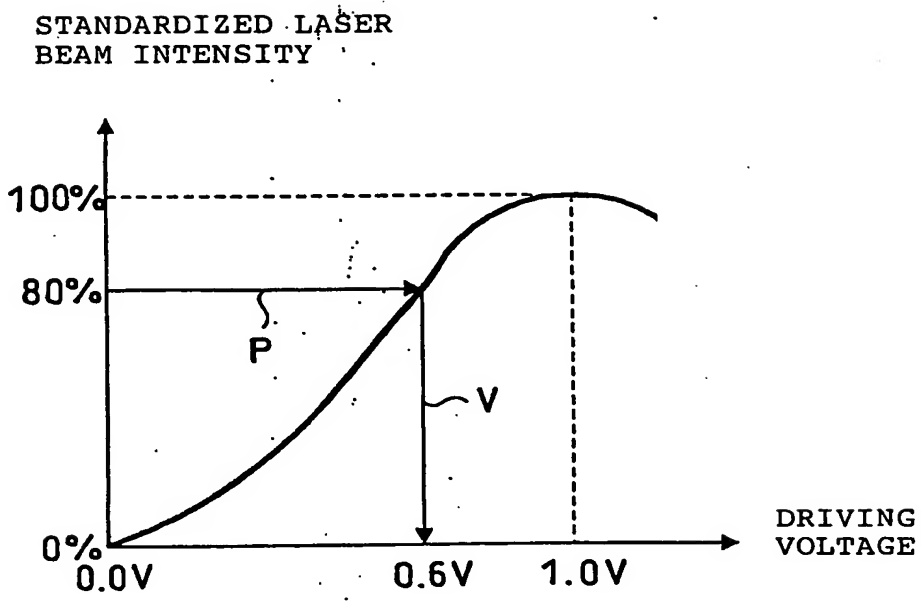

STANDARDIZED LASER
BEAM INTENSITY
100%
80%
0%
P
V
0.0V
0.6V
1.0V
DRIVING
VOLTAGE

FIG. 29

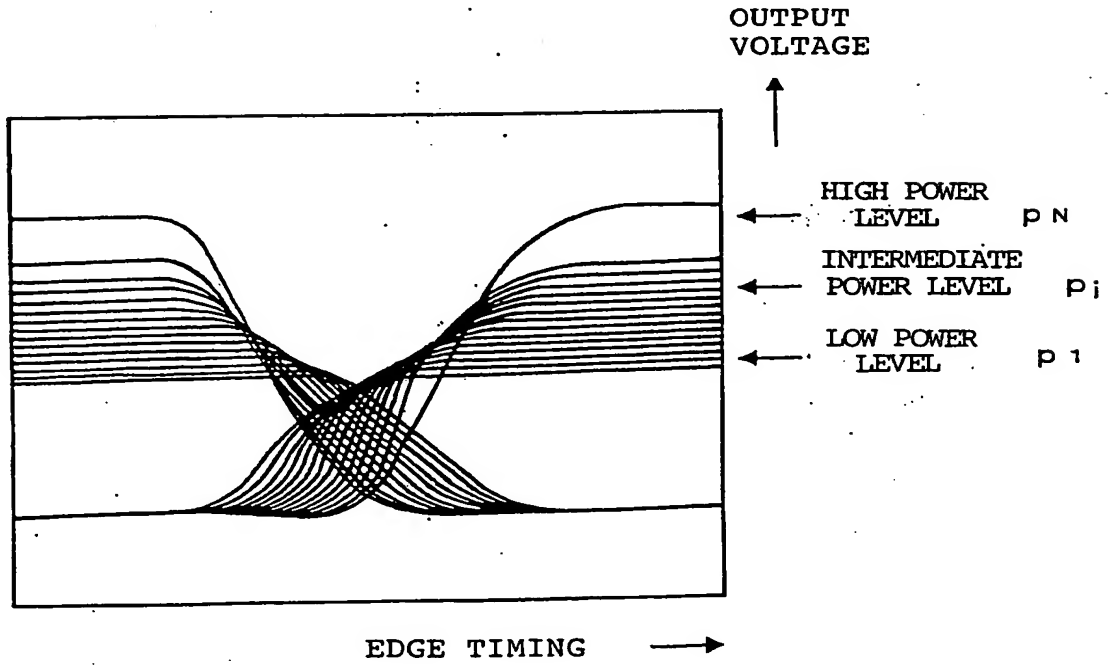

OUTPUT
VOLTAGE
HIGH POWER
LEVEL
pN
INTERMEDIATE
POWER LEVEL
pi
LOW POWER
LEVEL
p1
EDGE TIMING

FIG. 30B

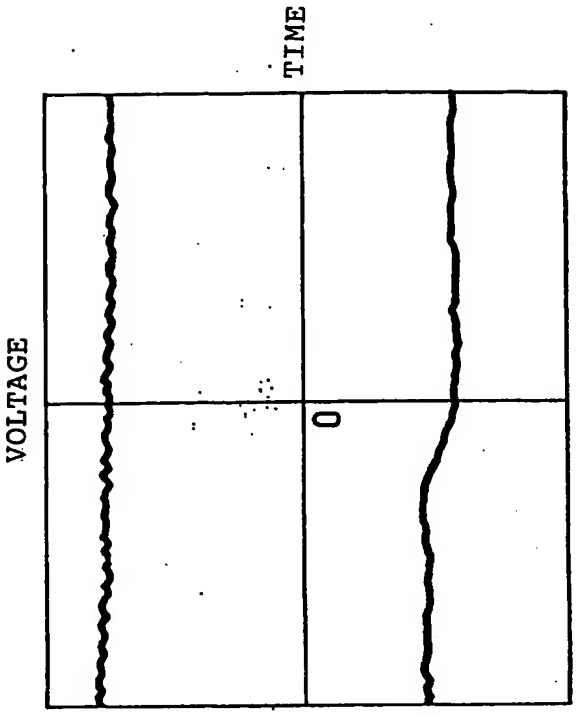


FIG. 30A

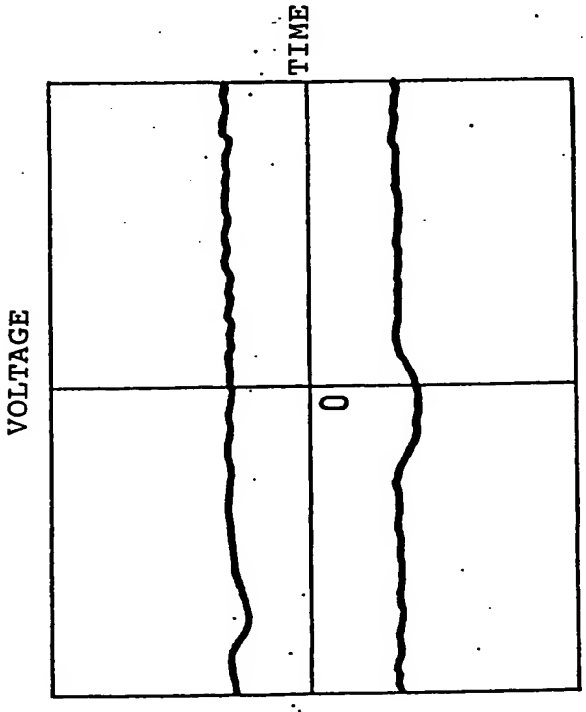


FIG. 31

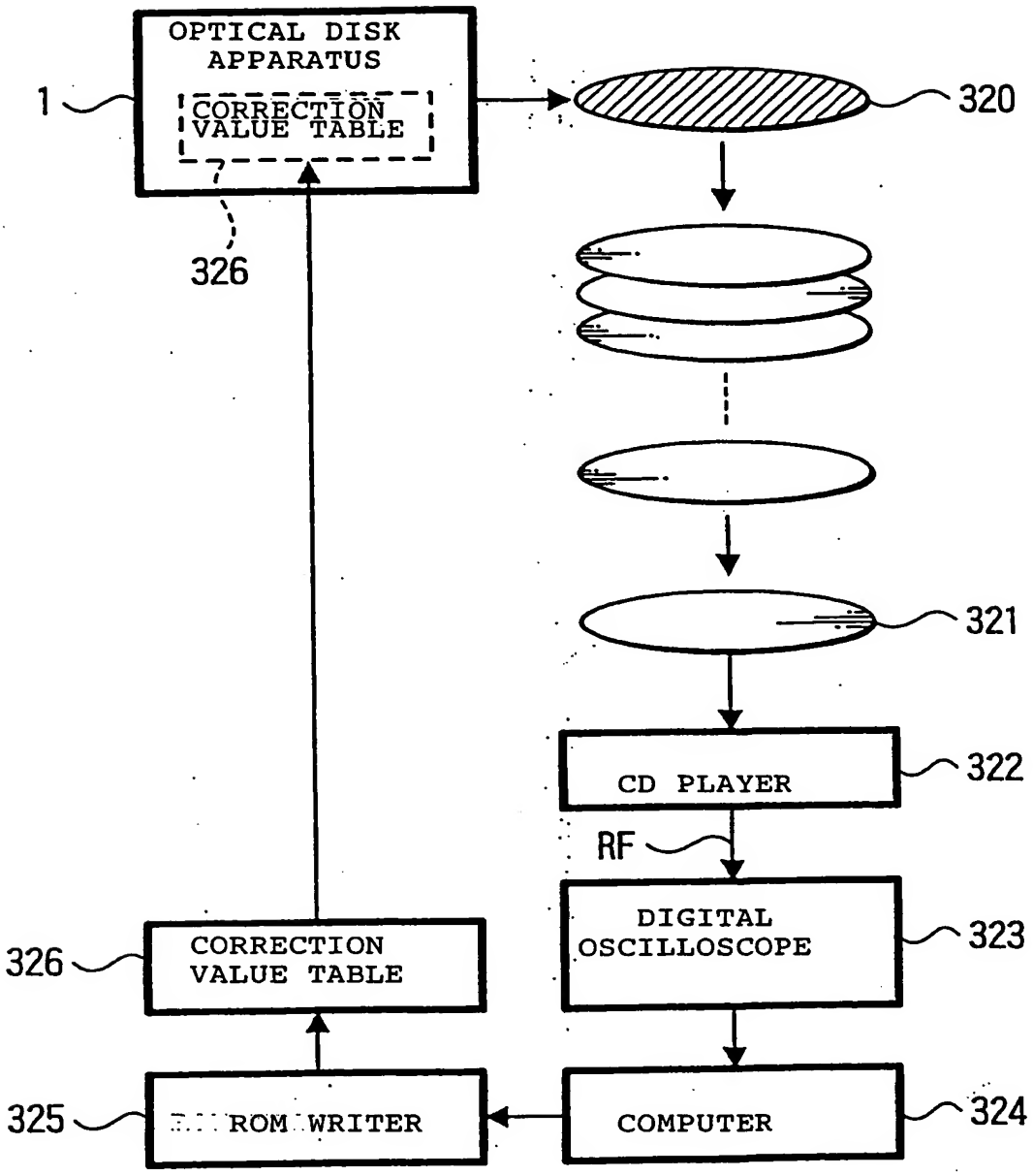
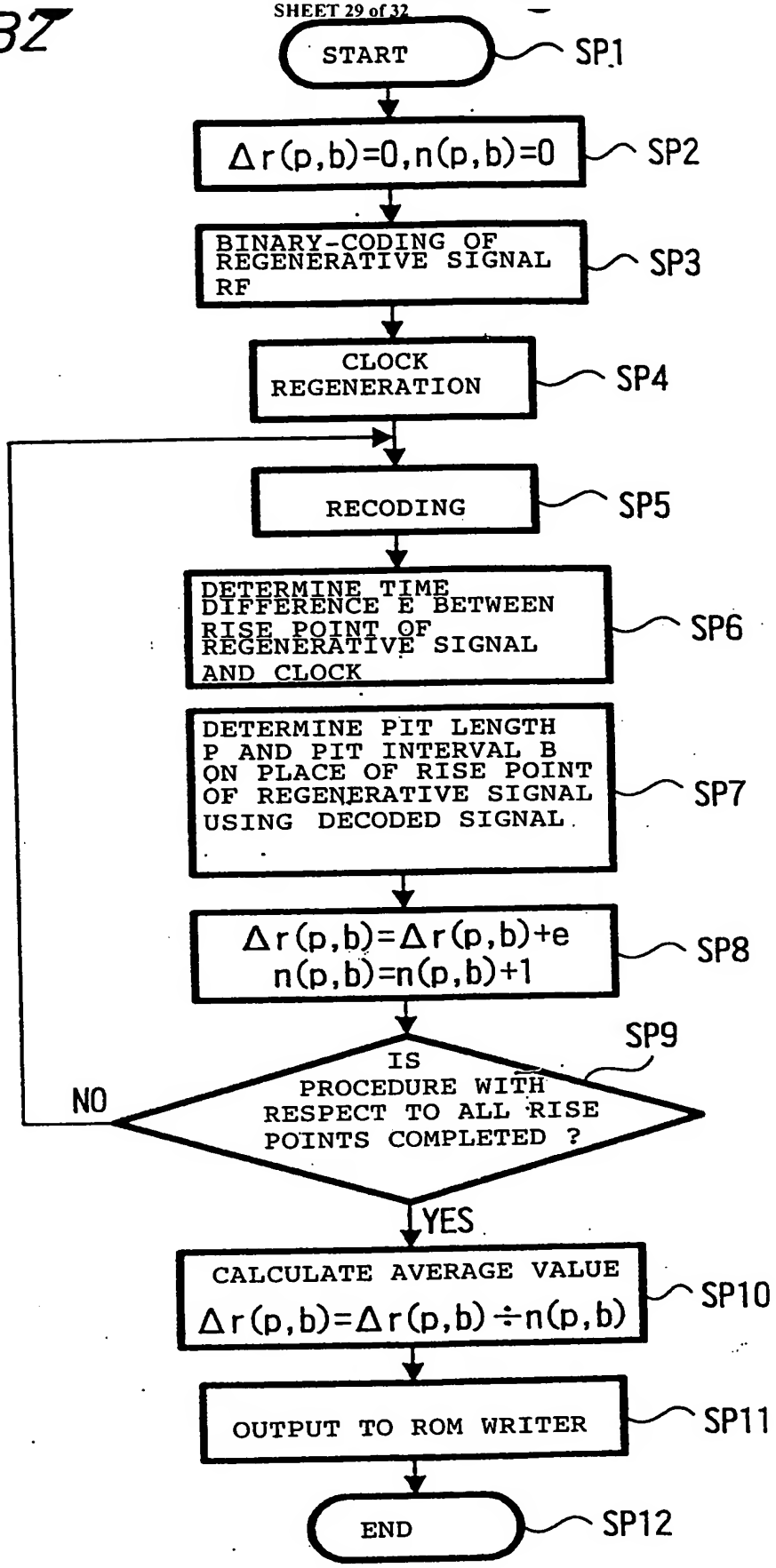

OPTICAL DISK APPARATUS
1
CORRECTION VALUE TABLE
326
320
321
CD PLAYER
322
RF
DIGITAL OSCILLOSCOPE
323
COMPUTER
324
ROM WRITER
325
CORRECTION VALUE TABLE
326

FIG. 32


START
SP1
Δr(p,b)=0,n(p,b)=0
SP2
BINARY-CODING OF REGENERATIVE SIGNAL RF
SP3
CLOCK REGENERATION
SP4
RECODING
SP5
DETERMINE TIME DIFFERENCE E BETWEEN RISE POINT OF REGENERATIVE SIGNAL AND CLOCK
SP6
DETERMINE PIT LENGTH P AND PIT INTERVAL B ON PLACE OF RISE POINT OF REGENERATIVE SIGNAL USING DECODED SIGNAL
SP7
Δr(p,b)=Δr(p,b)+e
n(p,b)=n(p,b)+1
SP8
IS PROCEDURE WITH RESPECT TO ALL RISE POINTS COMPLETED ?
SP9
NO
YES
CALCULATE AVERAGE VALUE
Δr(p,b)=Δr(p,b)÷n(p,b)
SP10
OUTPUT TO ROM WRITER
SP11
END
SP12

DESCRIPTION OF REFERENCE NUMERALS

1 ... optical disk apparatus

2 ... disk master

3 ... digital audio tape recorder

4 ... modulator circuit

5 ... rectangular coordinate position detecting circuit

6 ... image (character) signal generating circuit

7A, 7B ... edge position correcting circuit

8 ... data selector

9 ... laser

10A, 10B ... optical modulator

11 ... mirror

12 ... objective lens

13 ... spindle servo circuit

14 ... spindle motor

20 ... one-rotation counter

21 ... track counter

22 ... coordinate transforming circuit

30 ... CPU

31, 32 ... input port

33, 34 ... output port

60A ... rise edge correcting circuit

60B ... fall edge correcting circuit

61 ... PLL (Phase Locked Loop)

62 ... flip-flop

70 ... latch circuit

71 ... correction value table

72 ... monostable multi-vibrator

73 ... selector

74 ... delay circuit

130 ... staircase waveform generating circuit

131 ... timing correcting circuit

132 ... voltage converting circuit

140 ... rise edge detecting circuit

141 ... fall edge detecting circuit

142 ... up/down counter

143 ... reference oscillator

W ... transition area of pit width of second information

170 ... ROM

171 ... D/A converter

180 ... second modulator circuit

190 ... PLL (Phase Locked Loop)

191 ... signal overlapping circuit

192 ... timing correcting circuit

200 ... latch circuit

201, 202, 203 ... AND gate

204 ... OR gate

205 ... NAND gate

206 ... AND gate

207 ... latch circuit

240 ... EFM signal generating circuit

242 ... modulator circuit

243 ... edge position correcting circuit

244 ... power modulator circuit

247 ... CPU

248 ... mastering table

261, 262 ... multiplexor

263 ... power level control table

264 ... D/A converter

265 ... analog multiplexor

270 ... photo detector

271 ... A/D converter

272 ... CPU

320 ... stamper

321 ... compact disk

322 ... CD player

323 ... digital oscilloscope

324 ... computer

325 ... ROM writer

326 ... correction value table